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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,608	10/27/2003	Julius Koskela	60091.00245	6474

32294 7590 12/21/2006

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EXAMINER	
TRAN, KHAI	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/21/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/693,608	KOSKELA ET AL.	
	Examiner	Art Unit	
	KHAI TRAN	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,9,15 and 17* is/are rejected.

7)☒ Claim(s) *2-6,8,10-14,16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/30/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 7, 9, 15, 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Haapoja et al (US 2002/0127982 A1).

Regarding claim 1, Haapoja et al disclose a receiving method in a direct conversion receiver, the method comprising: receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band (see Figure 3, see [0045]); mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches (mixers 224A and 224B); converting the analog base band signal into a digital signal (analog-to-digital A/D converters 223A and 223B); measuring power levels (see [0059]) of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band (see Abstract, and [0017] which illustrates that downconverting a received RF signal to in-phase (I) and quadrature (Q) channel signals each containing a plurality of sub-carriers at a low intermediate frequency (low-IF) and, if required, one sub-carrier or a single carrier centered around 0 Hz; filtering interfering

signals outside of a frequency band of interest with analog lowpass filters in the I and Q channels; converting the I and Q channel signals to digital representations thereof, in the multi-carrier reception case, separating sub-carriers that are images of one another by quadrature downmixing the digital representations of the I and Q channel signals to baseband in the digital domain; and digitally adding or subtracting resulting I and Q signals to obtain one or both of an upper sideband and lower sideband containing desired ones of the multi-carriers. For a symmetric multi-carrier reception case the step of downconverting includes a step of tuning a local oscillator to a center frequency of a group of sub-carriers, while for an asymmetric multi-carrier reception case the step of downconverting includes a step of tuning a local oscillator between a middlemost sub-carrier and its interfering adjacent channel); estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals (see [0048] to [0050]).

Regarding claim 7, Haapoja et al disclose wherein the compensating step comprises compensating for the frequency-dependent phase imbalance and for the gain imbalance by digital filtering (see [0050]).

Claims 9 and 17 are similar to claim 1. Therefore, claims 9, 17 are rejected under a similar rationale.

Claim 15 is similar to claim 7. Therefore, claim 15 is rejected under a similar rationale.

Allowable Subject Matter

3. Claims 2-6, 8, 10-14, 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following is a statement of reasons for the indication of allowable subject matter: Haapoja et al fail to disclose wherein the step of estimating further comprises: transforming the I- and Q-signals into frequency domain using a discrete Fourier transform or a fast Fourier transform to provide signals X(f) and Y(f); estimating the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)), wherein X(f) and Y(f) denote the corresponding base band signals; wherein the step of estimating comprises estimating signal component-specific frequency-dependent phase imbalance factors when either the upper or the lower sideband signal component in the pair dominates in power over the another component; and estimating the frequency-dependent phase imbalance as half of a difference between the component-specific frequency-dependent phase imbalance factors.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Maddiotto et al (U.S. Pat. 6,690,735) disclose a broadband digital radio receiver.

Chien (US 2004/0203472 A1) discloses a transceiver.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHAI TRAN whose telephone number is (571) 272-3019. The examiner can normally be reached on 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAY PATEL can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KHAI TRAN
Primary Examiner
Art Unit 2611

KT
December 19, 2006